Rocks Development

A Day in the Trenches with Greg Bruno

Post Install Script Debugging

- Example extend-compute.xml:

```
<?xml version="1.0" standalone="no"?>

<kickstart>

<post>
ech "yo" 2&>1 > /tmp/fun
</post>

</kickstart>
```

Post Install Script Debugging

- Produces an XML syntax error

```
# rocks list host profile compute-0-1 > /tmp/ks.cfg
Traceback (most recent call last):
  File "/opt/rocks/bin/rocks", line 264, in ?
    command.runWrapper(name, args[i:])
  File "/opt/rocks/lib/python2.4/site-packages/rocks/commands/__init__.py", line 1868, in runWrapper
    self.run(self._params, self._args)
  .
  .
  .
  .

    parser.feed(line)
  File "/opt/rocks/lib/python2.4/site-packages/_xmlplus/sax/expatreader.py", line 220, in feed
    self._err_handler.fatalError(exc)
  File "/opt/rocks/lib/python2.4/site-packages/_xmlplus/sax/handler.py", line 38, in fatalError
    raise exception
xml.sax._exceptions.SAXParseException: <unknown>:78:11: not well-formed (invalid token)
```

Post Install Script Debugging

- One way to debug the error

```
# ROCKSDEBUG=y rocks list host profile compute-0-1 > /tmp/ks.cfg

   .
   .
   .

</kickstart>[parse1]
[parse1]<kickstart>
[parse1]
[parse1]<post>
[parse1]ech "yo" 2&>1 /tmp/fun
Traceback (most recent call last):
  File "/opt/rocks/bin/rocks", line 264, in ?
    command.runWrapper(name, args[i:])
  File "/opt/rocks/lib/python2.4/site-packages/rocks/commands/__init__.py",
    line 1868, in runWrapper
```

Post Install Script Debugging

- Can also use xmllint

```
<post>
ech "yo" 2&>1 > /tmp/fun
</post>

------------------------

# xmllint extend-compute.xml
extend-compute.xml:6: parser error :xmlParseEntityRef: no name
ech "yo" 2&>1 > /tmp/fun
              ^
```

Post Install Script Debugging

- Fix your syntax error in your XML file

```
<post>
ech "yo" > /tmp/fun
</post>
```

- But there still is a problem with the post script

Post Install Script Debugging

- After a node installs, there are several log files saved on the host
  - A key log file is: /var/log/rocks-install.log

Post Install Script Debugging

- Execute:

```
# rocks list host profile compute-0-0 > /tmp/ks.cfg
```

- Then examine /tmp/ks.cfg:

```
%post --log=/mnt/sysimage/var/log/rocks-install.log

ech "yo" > /tmp/fun
```

- Output from the commands in the post section will be saved to /var/log/rocks-install.log on the node's hard disk

Post Install Script Debugging

- Huh?
  - The filename says /mnt/sysimage/var/log/rocks-install.log
- The installer runs inside a ramdisk
  - The ‘root’ (e.g., ‘/’) for the installer is a ramdisk
  - The installer mounts the hard disk partitions under /mnt/sysimage

Post Install Script Debugging

- After the node installs, examine /var/log/rocks-install.log

```
./nodes/extend-compute.xml: begin post section
/tmp/ks-script-MP2uTd: line 2: ech: command not found
./nodes/extend-compute.xml: end post section
```

Post Install Script Debugging

- After the node installs, examine /var/log/rocks-install.log

```
./nodes/extend-compute.xml: begin post section
/tmp/ks-script-MP2uTd: line 2: ech: command not found
./nodes/extend-compute.xml: end post section
```

Post Install Script Debugging

- Put a “stall” in a post section

```
<post>
ech "yo" > /tmp/fun

while [ -f /tmp/fun ]
do
        sleep 1
done

</post>
```

Post Install Script Debugging

- When the node reinstalls, it will stall at the "Running post-install scripts" section

- Login to the installing node:

```
# ssh compute-0-0 -p 2200
```

Post Install Script Debugging

- Get list of processes:

```
# ps auwx
root      3783  0.0  0.0      0     0 ?        S    10:30   0:00 [pdflush]
root      4934  0.0  0.0  65888  1304 pts/0    S+   10:30   0:01 /bin/sh /tmp/ks-script-THsZwm
root     13548  0.3  0.0  62616  2980 ?        Ss   12:54   0:00 sshd: root@pts/1
root     13549  0.0  0.0  10764  1328 pts/1    Ss   12:54   0:00 -bash
```

Post Install Script Debugging

- Let's look at the /tmp/ks-script-* file

```
# cat /mnt/sysimage/tmp/ks-script-THsZwm

ech "yo" > /tmp/fun

while [ -f /tmp/fun ]
do
        sleep 1
done
```

- This is the contents of our post script

Post Install Script Debugging

- We can see what anaconda is doing by looking at /tmp/anaconda.log

```
# tail -f /tmp/anaconda.log
10:30:16 INFO    : moving (1) to step dopostaction
10:30:16 INFO    : Running kickstart %%post script(s)
10:30:20 ERROR   : Error code 127 encountered running a kickstart
%pre/%post script
10:30:26 ERROR   : Error code 9 encountered running a kickstart
%pre/%post script
```

Post Install Script Debugging

- Remove the file /mnt/sysimage/tmp/fun

```
# rm -f /mnt/sysimage/tmp/fun
```

- And the installation will continue

Holding An Installation After All Post Scripts Have Executed

- Add the “rocks-debug” kernel parameter to the installing kernel

- List all “bootactions”

```
# rocks list bootaction

ACTION               KERNEL                                    RAMDISK
ARGS
install:             vmlinuz-5.3-x86_64                        initrd.img-5.3-x86_64
ks ramdisk_size=150000 lang= devfs=nomount pxe kssendmac selinux=0 noipv6 ksdevice=bootif

install headless:    vmlinuz-5.3-x86_64                        initrd.img-5.3-x86_64
ks ramdisk_size=150000 lang= devfs=nomount pxe kssendmac selinux=0 noipv6 headless vnc
```

Holding An Installation After All Post Scripts Have Executed

- Create a new bootaction called “install debug” based on the “install” bootaction

```
# rocks add bootaction action="install debug" \
  kernel="vmlinuz-5.3-x86_64” ramdisk="initrd.img-5.3-x86_64 \
  args="ks ramdisk_size=150000 lang= devfs=nomount pxe \
  kssendmac selinux=0 noipv6 rocks-debug"
```

Holding An Installation After All Post Scripts Have Executed

- Assign “install debug” installaction to a node

```
# rocks list host
HOST           MEMBERSHIP CPUS RACK RANK RUNACTION INSTALLACTION
build-x86-64: Frontend   8    0    0    os        install
compute-0-1:  Compute    8    0    1    os        install
compute-0-0:  Compute    8    0    0    os        install

# rocks set host installaction compute-0-0 action="install debug”

# rocks list host
HOST           MEMBERSHIP CPUS RACK RANK RUNACTION INSTALLACTION
build-x86-64: Frontend   8    0    0    os        install
compute-0-1:  Compute    8    0    1    os        install
compute-0-0:  Compute    8    0    0    os        install debug
```

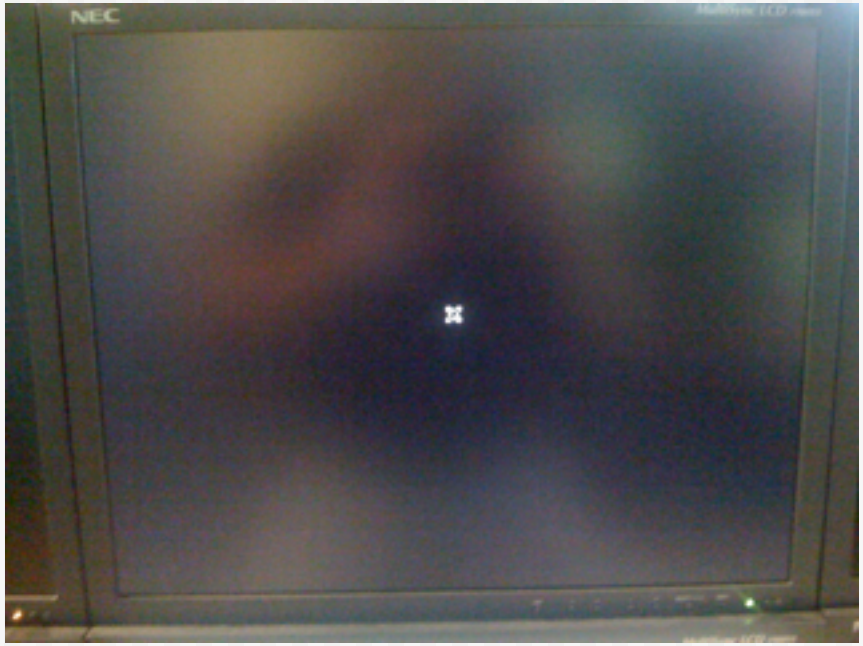
Holding An Installation After All Post Scripts Have Executed

- The PXE configuration file is updated with the “rocks-debug” flag

```
# cat /tftpboot/pxelinux/pxelinux.cfg/0A01FFFE
default rocks
prompt 0
label rocks
        kernel vmlinuz-5.3-x86_64
        append ks ramdisk_size=150000 lang= devfs=nomount pxe
         kssendmac selinux=0 noipv6 rocks-debug
         initrd=initrd.img-5.3-x86_64
```

Post Install Script Debugging

- When the node reinstalls, it will stall at the "initial X screen"



Post Install Script Debugging

- At this point, all post scripts have executed and the installation is stalled
  - Login to the node and you'll see:

```
# ssh compute-0-0 -p 2200

-bash-3.2# tail -f /tmp/anaconda.log

10:54:01 ERROR    : Error code 127 encountered running a kickstart %pre/%post script
10:54:07 ERROR    : Error code 9 encountered running a kickstart %pre/%post script
10:54:08 INFO     : All kickstart %%post script(s) have been run
```

Post Install Script Debugging

- You now have unlimited time to poke around on the node
- To complete the installation, you need to reboot the node (e.g., <Ctrl><Alt><Del>)
  - Or, if you logged in via “ssh compute-0-0 –p 2200” execute:

```
# reboot -f
```

Other Log Files on an *Installing* Node

- Look at other log files on an installing node

```
# ls /tmp/*log
/tmp/anaconda-http.log /tmp/httpd.log  /tmp/syslog
/tmp/anaconda.log      /tmp/ks-pre.log
```

- /tmp/httpd.log
  - Log messages from lighttpd
- /tmp/syslog
  - Typical syslog
- /tmp/anaconda-httpd.log
  - RPM download timing information
- /tmp/ks-pre.log
  - Output from “pre” scripts

/tmp/httpd.log

```
127.0.0.1 127.0.0.1 - [28/May/2010:10:45:11 -0700]
"GET /install/rocks-dist/x86_64/RedHat/RPMS/dmraid-
events-1.0.0.rc13-53.el5.x86_64.rpm HTTP/1.1" 200 18083
"-" "urlgrabber/3.1.0 yum/3.2.22”

127.0.0.1 127.0.0.1 - [28/May/2010:10:45:13 -0700]
"GET /install/rocks-dist/x86_64/RedHat/RPMS/compat-
libf2c-34-3.4.6-4.i386.rpm HTTP/1.1" 200 2674 "-"
"urlgrabber/3.1.0 yum/3.2.22"
```

/tmp/syslog

```
<4>raid6: int64x4   1929 MB/s
<4>raid6: int64x8   1585 MB/s
<4>raid6: sse2x1    3195 MB/s
<4>raid6: sse2x2    5332 MB/s
<4>raid6: sse2x4    6058 MB/s
<4>raid6: using algorithm sse2x4 (6058 MB/s)
<6>md: raid6 personality registered for level 6
<6>md: raid5 personality registered for level 5
<6>md: raid4 personality registered for level 4
```

/tmp/anaconda-httpd.log

```
1275068709.09: RedHat/RPMS/dmraid-events-1.0.0.rc13-53.el5.x86_64.rpm start
1275068711.1: RedHat/RPMS/dmraid-events-1.0.0.rc13-53.el5.x86_64.rpm end
1275068711.1: RedHat/RPMS/compat-libf2c-34-3.4.6-4.i386.rpm start
1275068713.1: RedHat/RPMS/compat-libf2c-34-3.4.6-4.i386.rpm end
```

/tmp/ks-pre.log

```
/tmp/ks-script-mvCzD5: line 12: /opt/rocks/bin/ci: No such file or directory
/tmp/ks-script-mvCzD5: line 13: /opt/rocks/bin/co: No such file or directory
```

Log Files on an *Installed* Node

- After a node is installed, several log files are saved under “/root”

```
# ls /root/*log
/root/httpd.log    /root/install.log.syslog  /root/rocks-pre.log
/root/install.log  /root/rocks-post.log
```

- /root/httpd.log
  - A copy of the log messages from lighttpd
- /root/install.log
  - A list of RPMs installed by anaconda
- /root/install.log.syslog
  - Post script error messages
- /root/rocks-pre.log, /root/rocks-post.log
  - Output from rocks-pre.sh and rocks.post.sh scripts

/root/install.log

```
Installing hal-0.5.8.1-52.el5.i386
Installing kudzu-1.2.57.1.21-1.el5.centos.x86_64
Installing hal-0.5.8.1-52.el5.x86_64
Installing system-config-network-tui-1.3.99.18-1.el5.noarch
Installing firstboot-tui-1.4.27.7-1.el5.centos.x86_64
```

- Shows the packages that were installed
  - And it shows the “architecture” of the package

/root/install.log.syslog

```
<86>May 28 10:53:53 useradd[3907]: new group: name=nfsnobody, GID=4294967294
<86>May 28 10:53:53 useradd[3907]: new user: name=nfsnobody, UID=4294967294,
GID=4294967294, home=/var/lib/nfs, shell=/sbin/nologin
<86>May 28 10:53:53 useradd[3925]: new group: name=haldaemon, GID=68
<86>May 28 10:53:53 useradd[3925]: new user: name=haldaemon, UID=68, GID=68,
home=/, shell=/sbin/nologin
```

- I never look at this file!

/root/rocks-pre.log /root/rocks-post.log

- On the first boot after an installation, the following scripts are run:

```
/root/rocks-pre.sh
/root/rocks-post.sh
```

- The scripts ensure the file permissions set with “<file>” tags are maintained

Node XML file:

```
<file name="/etc/rc.d/init.d/mdmonitor" perms="755”>
```

/root/rocks-pre.sh:

```
if [ -f /etc/rc.d/init.d/mdmonitor ]; then
        echo "rocks" | /opt/rocks/bin/ci /etc/rc.d/init.d/mdmonitor;
        /opt/rocks/bin/co -f -l /etc/rc.d/init.d/mdmonitor;
fi
chmod 755 /etc/rc.d/init.d/mdmonitor
```

/root/rocks-pre.log /root/rocks-post.log

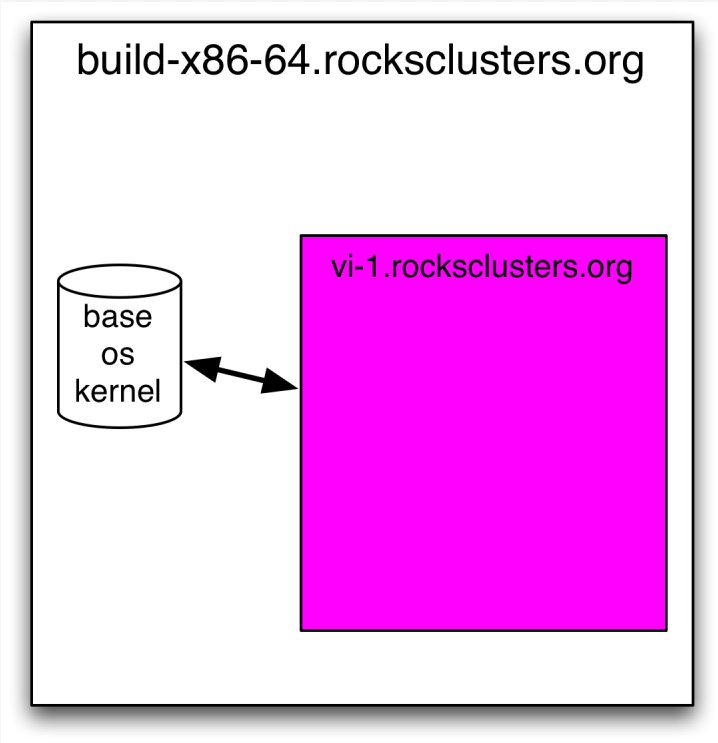
- The log files mainly contain RCS status messages
  - All files modified with a “<file>” tag are managed with RCS

```
/etc/rc.d/init.d/RCS/mdmonitor,v  <--  /etc/rc.d/init.d/mdmonitor
new revision: 1.2; previous revision: 1.1
done
/etc/rc.d/init.d/RCS/mdmonitor,v  -->  /etc/rc.d/init.d/mdmonitor
revision 1.2 (locked)
done
```

“Lights Out” Frontend Installation

“Lights Out” Frontend Install

- Fully-automated frontend install
- Install a virtual frontend (vi-1) inside a physical frontend (build-x86-64)



“Lights Out” Frontend Install

- How it works:
  - On a normal installation:
    - After the user selects the rolls, a file named /tmp/rolls.xml is created
    - After the user inputs all data in the user “screens” (e.g., “Enter Private Network Configuration”), a file named /tmp/site.attrs is created
  - So, if the files /tmp/site.attrs and /tmp/rolls.xml already exist on the ramdisk, then the machine will bypass the user screens and automatically install

Lights Out Frontend Installation

- Create a virtual frontend

```
# rocks add cluster vi-1.rocksclusters.org 137.110.119.118 0
```

- Set attributes

```
# rocks set host attr vi-1.rocksclusters.org \
    Kickstart_PrivateHostname vi-1

# rocks set host attr vi-1.rocksclusters.org \
    Kickstart_PublicAddress 137.110.119.118

# rocks set host attr vi-1.rocksclusters.org \
    Kickstart_PublicHostname vi-1.rocksclusters.org

# rocks set host attr vi-1.rocksclusters.org \
    Kickstart_PublicKickstartHost build-x86-64.rocksclusters.org
```

Assign Rolls to the New Frontend

```
# rocks set host roll vi-1.rocksclusters.org os 5.3 x86_64
# rocks set host roll vi-1.rocksclusters.org base 5.3 x86_64
# rocks set host roll vi-1.rocksclusters.org kernel 5.3 x86_64


# rocks list host roll vi-1.rocksclusters.org
HOST             NAME   VERSION ARCH   OS
frontend-0-0-0: os     5.3     x86_64 linux
frontend-0-0-0: base   5.3     x86_64 linux
frontend-0-0-0: kernel 5.3     x86_64 linux
```

/tmp/rolls.xml

```
# rocks report host roll vi-1.rocksclusters.org
<rolls>
<roll
          name="os"
          version="5.3"
          arch="x86_64"
          url="http://build-x86-64.rocksclusters.org/install/rolls/"
          diskid=""
/>
<roll
          name="base"
          version="5.3"
          arch="x86_64"
          url="http://build-x86-64.rocksclusters.org/install/rolls/"
          diskid=""
/>
<roll
          name="kernel"
          version="5.3"
          arch="x86_64"
          url="http://build-x86-64.rocksclusters.org/install/rolls/"
          diskid=""
/>
</rolls>
```

/tmp/site.attrs

```
# rocks report host attr vi-1.rocksclusters.org
   .
   .
   .
Kickstart_PublicAddress:137.110.119.118
Kickstart_PublicBroadcast:137.110.119.255
Kickstart_PublicDNSDomain:rocksclusters.org
Kickstart_PublicDNSServers:8.8.8.8
Kickstart_PublicGateway:137.110.119.1
Kickstart_PublicHostname:vi-1.rocksclusters.org
Kickstart_PublicKickstartHost:build-x86-64.rocksclusters.org
Kickstart_PublicNTPHost:pool.ntp.org
   .
   .
   .
```

Need to Create rolls.xml and site.attrs

- Create node XML file ‘extend-wan.xml’
  - In the directory:
    - /export/rocks/install/site-profiles/5.3/nodes

Need to Create rolls.xml and site.attrs Files in the Installer

```
<?xml version="1.0" standalone="no"?>

<kickstart>

<pre>

<file name="/tmp/site.attrs">
<eval>/opt/rocks/bin/rocks report host attr &hostname;</eval>
</file>

<file name="/tmp/rolls.xml">
<eval>/opt/rocks/bin/rocks report host roll &hostname;</eval>
</file>

</pre>

</kickstart>
```

Rebuild the Distro and Boot the VM

```
# cd /export/rocks/install
# rocks create distro

# rocks start host vm vi-1.rocksclusters.org
```

- 10 minutes later, you've got a new frontend!

Fin

Partitioning

Partitioning

- You can see what the “programmatic partitioning” will do
- Login to compute node and execute:

```
# ssh compute-0-0 p 2200

-bash-3.2# /tmp/product/do_partition.py
part / --fstype ext3 --onpart sda1
part /var --fstype ext3 --onpart sda2
part swap --noformat --onpart sda3
part /state/partition1 --noformat --onpart sda5
```

Partitioning

- If you have a bug in your programmatic partitioning code, you'll need to recreate the code from the 'pre' script
  - On the frontend, create /tmp/ks.cfg

```
# rocks list host profile compute-0-0 > /tmp/ks.cfg
```

  - Find the 'pre' script in /tmp/ks.cfg with your partitioning code
- Make a new file named /tmp/a.py from the partitioning code

/tmp/a.py

```
#!/opt/rocks/bin/python

import rocks_partition

membership = 'Compute'
nodename = 'compute-0-1'

def doDisk(file, disk):
        file.write('clearpart --all --initlabel --drives=%s\n' % disk)
        file.write('part / --size=6000 --fstype=ext3 --ondisk=%s\n' % disk)
        file.write('part /var --size=2000 --fstype=ext3 --ondisk=%s\n' % disk)
        file.write('part swap --size=2000 --ondisk=%s\n' % disk)
        file.write('part /mydata --size=1 --grow --fstype=ext3 --ondisk=%s\n'
                % disk)

#
# main
#
p = rocks_partition.RocksPartition()
disks = p.getDisks()

if len(disks) == 1:
          file = open('/tmp/user_partition_info', 'w')
          doDisk(file, disks[0])
          file.close()
```

Copy the Script to the Compute Node

- Put the script in /tmp/product on the compute node

```
-bash-3.2# scp 10.1.1.1:/tmp/a.py /tmp/product/a.py
```

- Run it:

```
-bash-3.2# ./a.py

-bash-3.2# cat /tmp/user_partition_info
clearpart --all --initlabel --drives=sda
part / --size=6000 --fstype=ext3 --ondisk=sda
part /var --size=2000 --fstype=ext3 --ondisk=sda
part swap --size=2000 --ondisk=sda
part /mydata --size=1 --grow --fstype=ext3 --ondisk=sda
```